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## (54) Utility surface

(57) A utility surface such as an activity surface for playing a sport, e.g. football, consists of or comprises an element 1 having a body providing an upper surface and hover means 3 disposed in or on the body at or adjacent an underside thereof, the hover means 3 being constructed and arranged so that, when connected to a supply of a pressurized fluid, the hover means 3 will create and sustain at the underside of the body a film of the said pressurized fluid, the presence and effect of such film being to raise the utility surface above an underlying support surface, and to enable the utility surface to be moved laterally across such underlying surface. The body may comprise a tray member 2, containing a filling of soil 7 in which is growing natural grass 8, and disposed within the tray 2 is a flexible, porous lining 4. The hover means may comprise a plurality of air bearing elements.

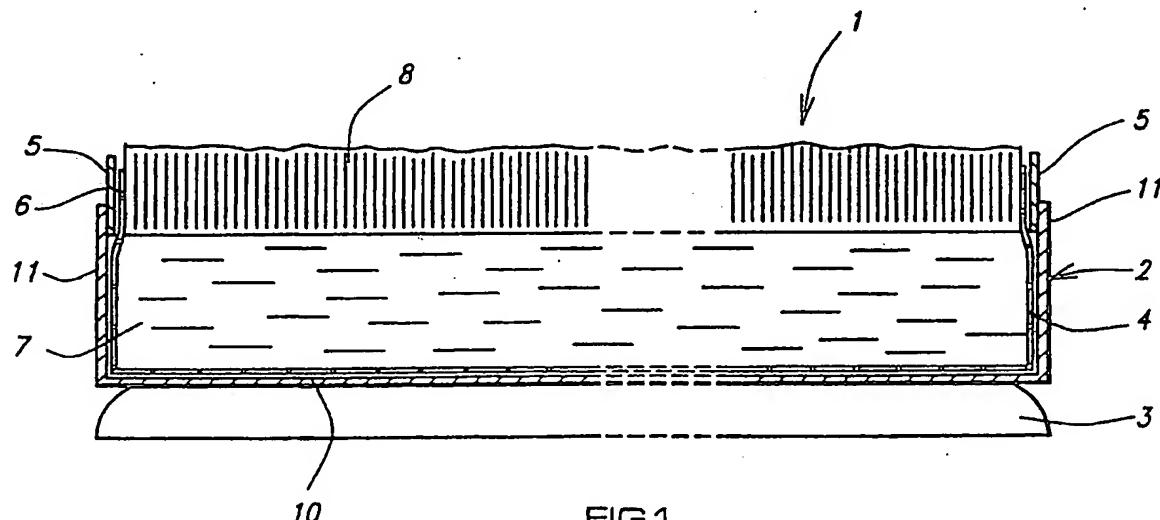


FIG.1.

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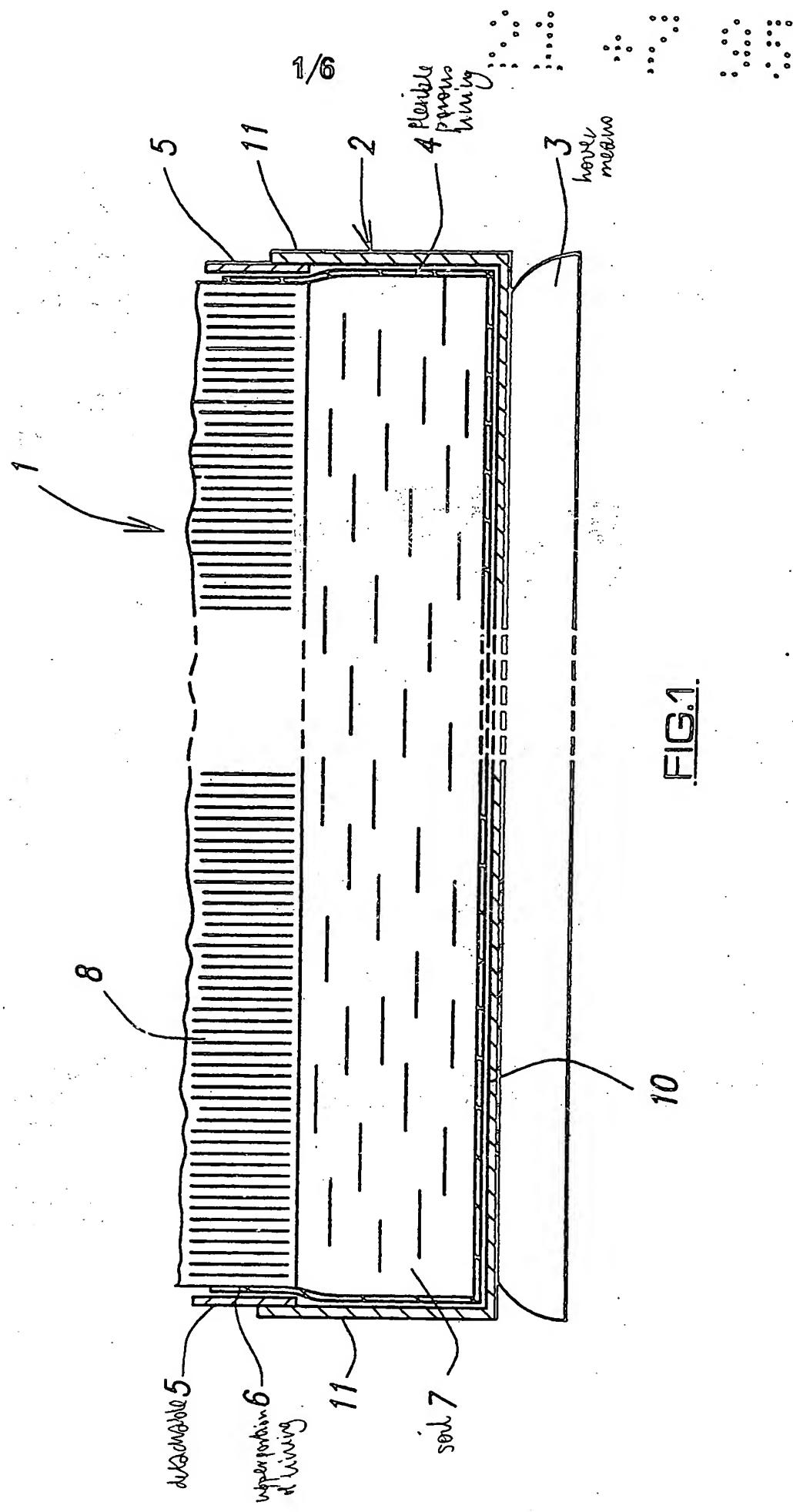


FIG.1.

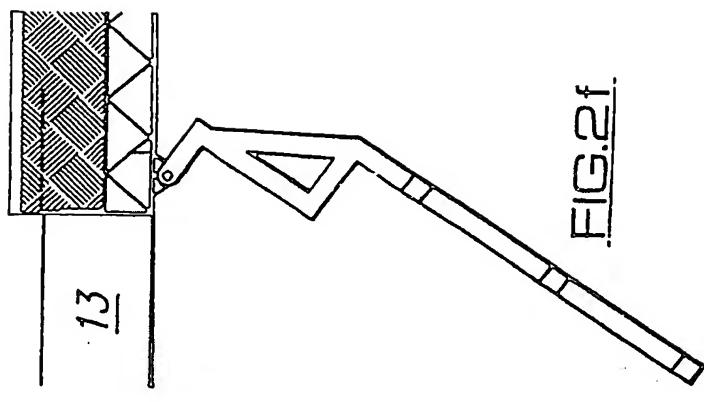


FIG.2f

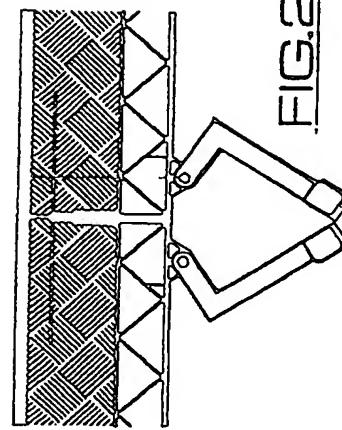


FIG.2d

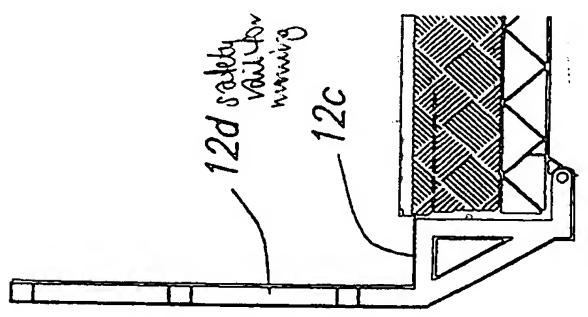


FIG.2e

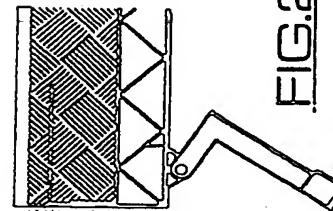


FIG.2c

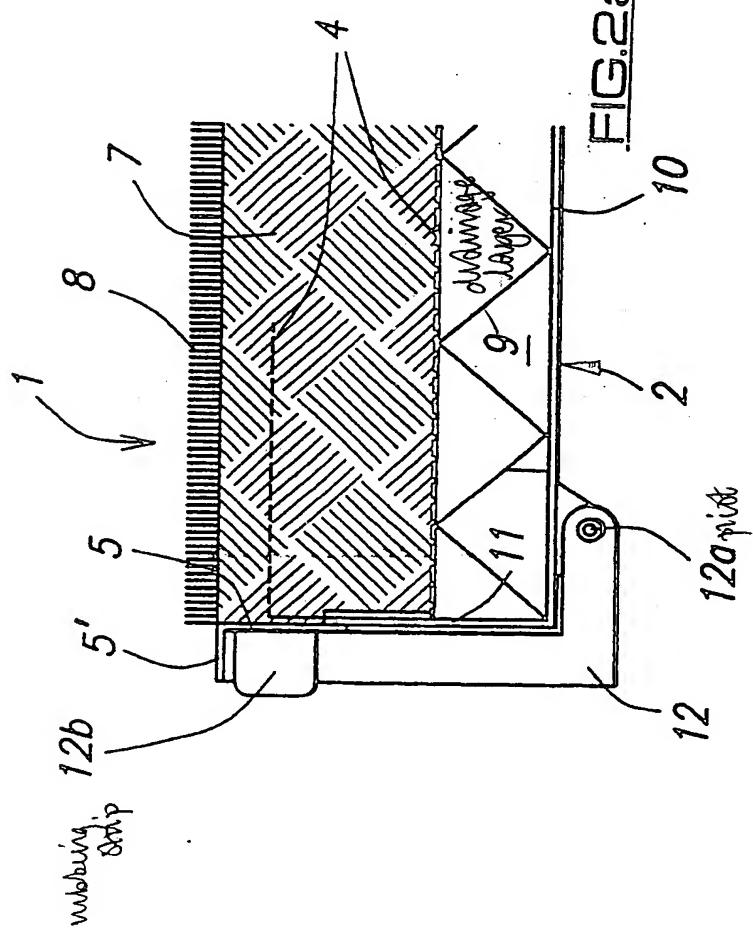


FIG.2a

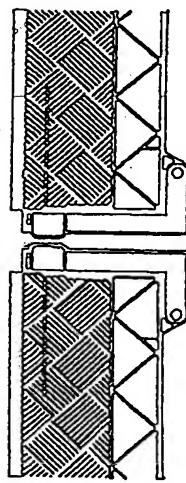
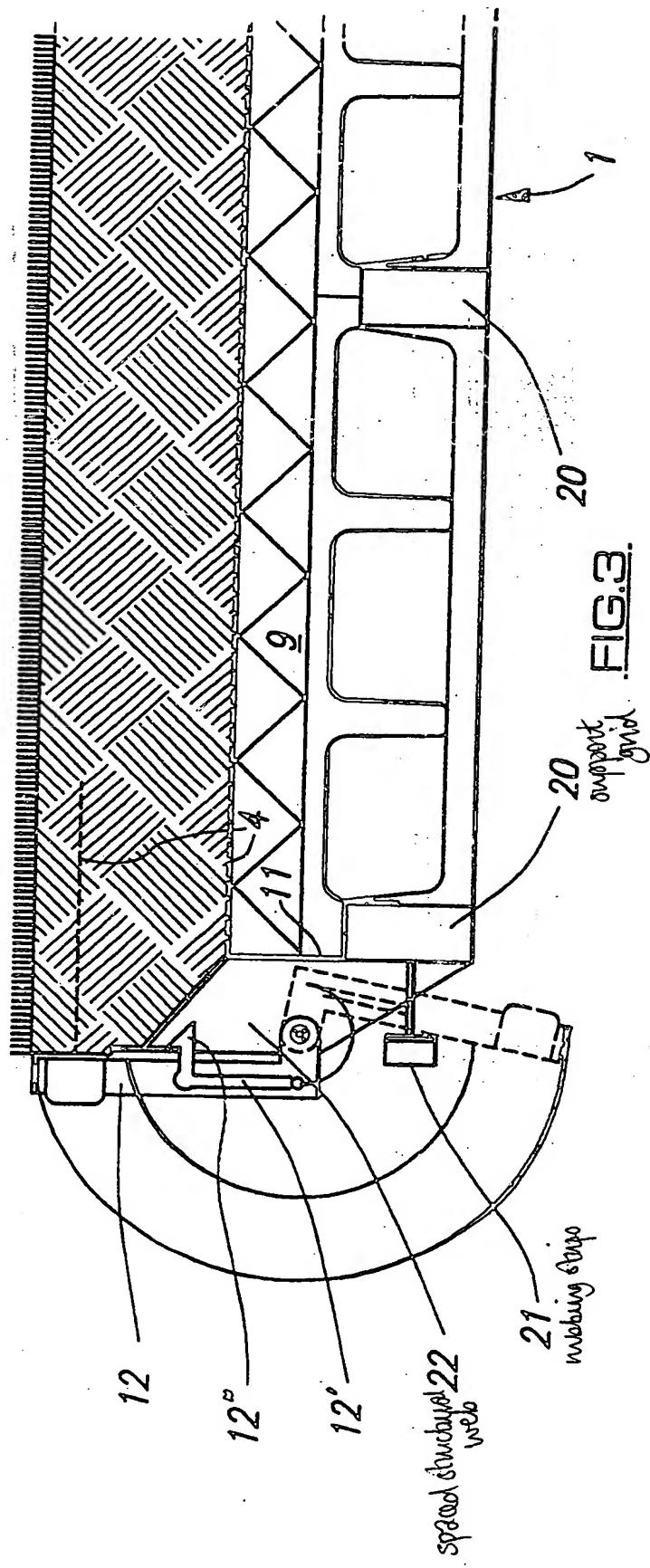
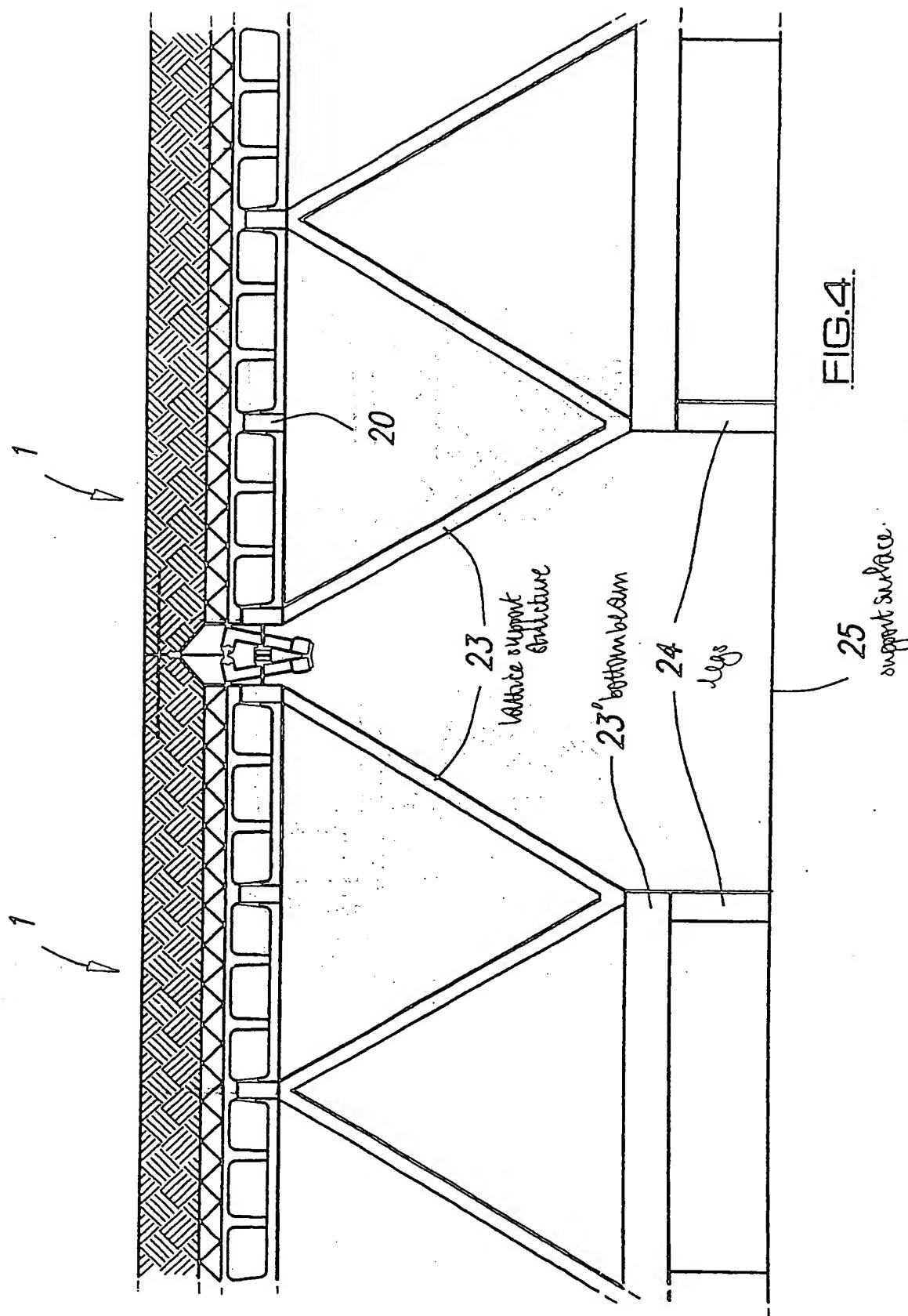


FIG.2b





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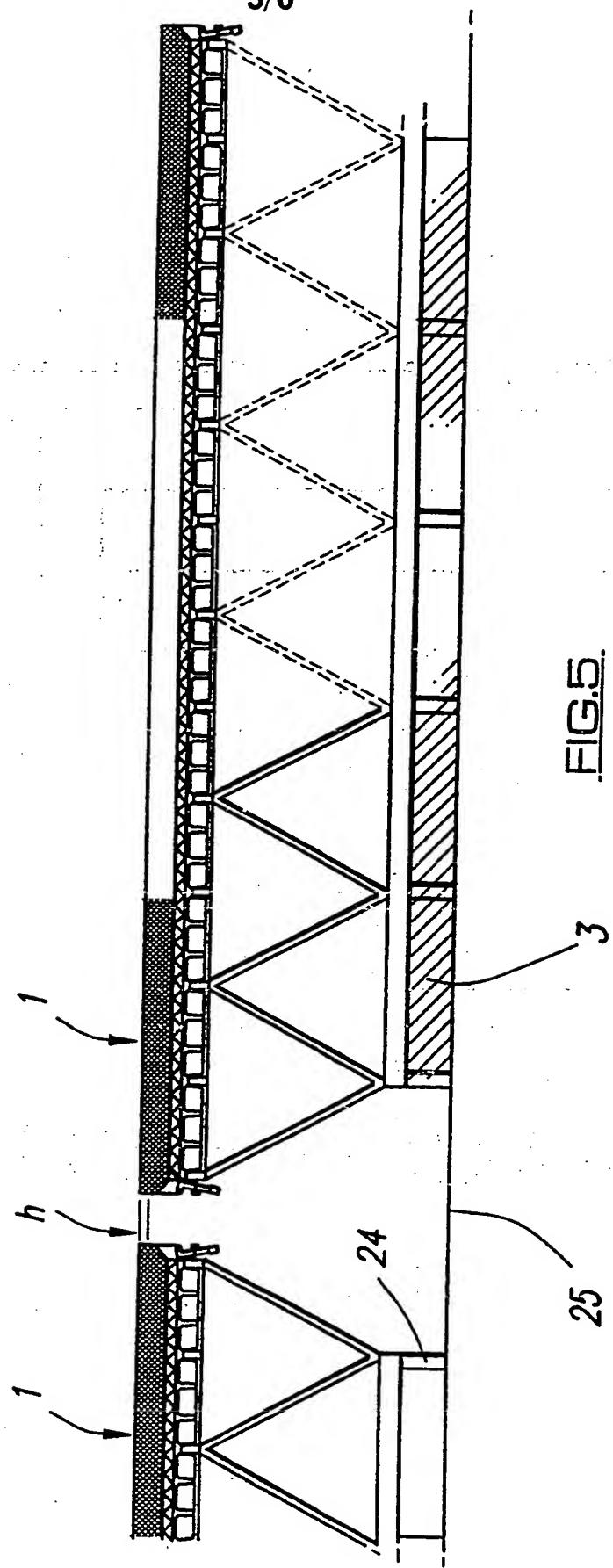


FIG.5.

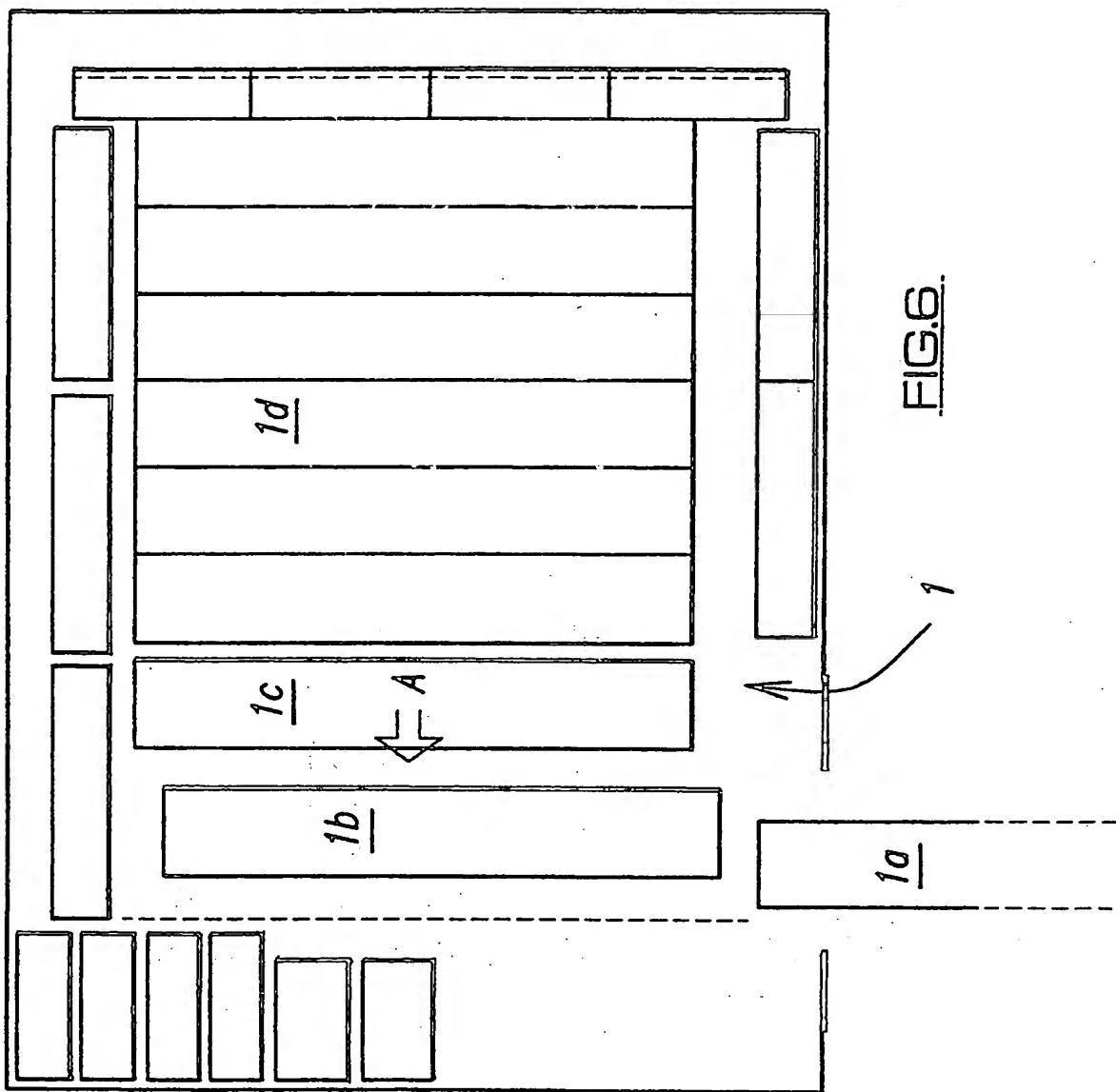


FIG.6.

UTILITY SURFACE

This invention relates to a utility surface, that is a surface of considerable area offering functional 5 utility, for example, for use in playing sports, for use as a support surface for the display, storage, or stacking of articles, for use as a transportation surface such as a car park or temporary roadway, or multifarious other commercial and/or recreational 10 uses.

Although the utility surface to which the invention is directed is of broad conception, as outlined in the foregoing paragraph, this invention is 15 particularly concerned with such a form of utility surface which shall herein be known as an activity surface. By "activity surface" is meant an area constructed and arranged for the performance of a particular human activity, especially the playing of 20 a sport or game. The invention will particularly be exemplified in relation to a football pitch.

A football pitch is an example of an activity surface which, by virtue of its intended use and 25 disposition, is of large surface area and subject to extreme wear and tear both by the users and by exposure to the natural elements. Traditionally, a football pitch comprises an area of natural living grass, although artificial pitches have been known for 30 some time. This traditional type of football pitch suffers from a number of disadvantages. The material of the playing surface, whether it be natural or artificial grass, is normally permanently disposed on an area of ground where it is intended for its planned 35 use. In such a disposition, unless it is covered by some protective means, such as a tarpaulin, it will be

exposed to the natural elements. Whether or not temporarily covered by a protective cover, this permanent disposition complicates the procedures of normal maintenance and incurs a high background cost element. Further, the underlying area of ground is not usable for any other activity. Regular maintenance of the material of the playing surface needs to be carried out regardless of prevailing weather conditions and there will often be a need for a protective covering in order, for example, to reduce the risk of waterlogging due to excessive precipitation. The labour costs incurred in the overall management and care of such a pitch are considerable. Moreover, should a specific proportion of the playing area require longer term or more intensive maintenance, complications may arise from the need to continue to provide the playing area for use, in which case it may be difficult or impossible to provide an optimum condition of playing surface overall throughout the entirety of the normal football season. Clearly, in certain areas of the pitch, such as the goalmouths, a worsening condition of the playing surface may pose serious problems of pitch management.

The present invention starts from a recognition of these and other disadvantages of the traditional football pitch, and also recognises the need for more cost effective, more readily manageable and efficient construction and arrangement of such a pitch. Accordingly, the present invention aims to eliminate or at least substantially reduce these and other disadvantages of the prior art.

In one aspect, the present invention provides a utility surface comprising a body affording an upper

surface intended for use and operable hover means associated or associable with the body at or adjacent an underside thereof, the hover means being arranged such that, when operated, it creates and sustains at 5 the underside of the body a fluid cushion, the presence and effect of the air fluid cushion being to raise the body above an underlying support surface, thereby enabling the utility surface to be moved laterally across said underlying surface.

10

Preferably, the hover means comprises at least one fluid bearing element, especially at least one air bearing or air skate, such as that sold under the Trade Mark HOVAIR available from Air-Log Limited.

15

However, any other suitable hover means for generating an air cushion may be used.

20

A source affording a supply of pressurised fluid for the hover means may be mounted on the body, such a source preferably being of compressed air.

25

Preferably also, the body of the utility surface comprises an element of generally tray-shape, having upstanding side walls and intended to receive a filling material or materials to an appropriate depth, such material or materials when so-received, providing the upper, useful surface of the body.

30

More preferably, the generally tray-shaped element is lined internally with a flexible membrane, optionally porous, which assists in the retention and general maintenance of the material or materials providing the upper surface. In the case of a football pitch comprising soil and naturally growing 35 grass, the internally lined tray-shaped element receives a layer of soil to a suitable depth, with an

upper surface layer of grass growing in the soil, in which case, the height of the grass may be greater than that of the flexible membrane, to provide a grass-to-grass joint(s) when two or more of the 5 elements are brought into juxtaposition.

Where, as in the case with a football pitch, for example, the utility surface has a very large surface area, it will be necessary or desirable to sub-divide 10 it into a plurality of smaller elements. Each such element will normally be independent of all such other elements, will be identical or similar to each other such element, and may, in itself, be constructed and arranged as already outlined in the first aspect of 15 the invention as set forth above. In the case where the utility surface is composed of a plurality of such elements, it will be necessary to construct the elements such that when they are juxtaposed with one another, in a condition of use, the upper, playing 20 surface is seen and experienced to be continuous.

In a second aspect, the present invention provides an element for use in constructing a utility surface, the element comprising a generally tray-shaped member having at least one upstanding side wall, an upper portion of the or at least one of said 25 side walls being detachable or otherwise movable, and a flexible lining disposed within the interior of the tray-shaped member, and having a portion thereof lying adjacent the or each side wall. 30

In the case of a utility surface comprising soil and naturally growing grass, soil may be placed within the internally lined tray member to a level 35 terminating at approximately the lower edge of the or each detachable upper portion of side wall(s). Grass

which is seeded and allowed to grow within the soil, is permitted to attain a height just above the upper edge of the detachable or otherwise movable upper portion(s) of the side wall(s). The peripheral edge 5 of the area of growing grass is thus contained within the upper region of the flexible member and that is, in turn, at least supported externally by the upper, detachable or otherwise movable portions of the side walls.

10

When a plurality of utility surface elements are assembled side by side to form a complete utility surface, the detachable or otherwise movable side wall portion(s) of adjacent elements are detached or 15 otherwise moved, and the thus-exposed upper portions of the flexible members of the adjacent elements are pressed laterally into mutual engagement. The natural springiness of the growing grass ensures that the grass at the peripheral regions of adjacent elements 20 expands or springs slightly laterally, so as to give the appearance and experience of a continuous surface.

25 Each element may be provided with legs of adjustable height, to facilitate its being brought into juxtaposition with another element, as will be described in more detail hereinbelow.

30 A third aspect of the invention provides a method of preparing a utility surface for use, wherein a source of compressed air is energised in order to provide a continuous supply of compressed air to hover means associated or associative with a body of the surface, such as to create and sustain at the 35 underside of the body a cushion of compressed air, which raises the utility surface above an underlying

support surface, and traversing the utility surface laterally relative to the underlying support surface from a storage position to a position of use, and de-energizing said source of pressurized air whereby the 5 utility surface comes to rest under its own weight upon the underlying support surface.

A fourth aspect of the invention provides a method of preparing a games pitch for use, comprising 10 providing a plurality of pitch elements at a storage position, moving a selected number of the plurality of pitch elements from the storage position to a position of use in which the elements are arranged in juxtaposition to afford a surface area corresponding 15 to at least the required dimensions of the pitch, and securing such pitch elements in such juxtaposition, movement of such pitch elements from the storage position being performed by traversing each such element over an underlying support surface whilst 20 being supported from said support surface by a cushion of a pressurized fluid.

A fifth aspect of the invention resides in a method of preparing a games pitch for use, comprising 25 providing a plurality of pitch elements at a storage position, each pitch element having a length substantially equal to the intended size of the games pitch in a first dimension and a width substantially equal to an exact sub-multiple of the intended size of 30 the games pitch in a second dimension at right angles to the first dimension, moving a selected member of the plurality of pitch elements from the storage position to a position of use in which the elements are arranged in juxtaposition in a two-dimensional 35 linear array which has one dimension substantially equal to the elemental length and another dimension

substantially equal to a multiple of the elemental width, and securing such pitch elements in such juxtaposition, movement of the pitch elements from the storage position being performed by transversing each 5 such element over an underlying support surface whilst being supported from said support surface by a cushion of a pressurized fluid.

The invention will now be described in greater 10 detail with reference to particular embodiments of a utility surface devised, constructed, and arranged as a football pitch. The following, non-limitative descriptive example of the invention is given in relation to the accompanying drawings which 15 diagrammatically illustrate a utility surface element and a utility surface in accordance with the invention, and in which:

Figure 1 is a diagrammatic elevation of a utility 20 surface element illustrating the concept of the present invention;

Figure 2a is a detailed partial elevation of a first practical form of utility surface element in accordance with the present invention;

Figures 2b, 2c and 2d are diagrammatic views 25 showing a pair of utility surface elements of Figure 2a in various relative configurations;

Figures 2e and 2f are diagrammatic views showing 30 a modified utility surface element in different configurations;

Figure 3 is a detailed partial elevation of a second practical form of utility surface element in accordance with the present invention;

Figure 4 is a diagrammatic view showing a pair of 35 utility surface elements of Figure 3 in juxtaposition;

Figure 5 is a diagrammatic view similar to Figure

4, but showing the relative configuration of the two utility surface elements prior to achieving the juxtaposed state shown in Figure 4; and

5 Figure 6 is a diagrammatic plan view of a football pitch in accordance with the present invention and in a state of disassembly.

10 With reference first to Figure 1, a utility surface element 1 comprises a body including a generally tray-shaped member 2.

15 As can be seen, the member 2 comprises a base 10 and upstanding side walls 11. The tray member 2 is of generally square or rectangular shape, when seen in plan view, and is made of any suitable material, for example steel. An upper portion 5 of each side wall 11 is a detachable therefrom and, in the example shown, is slightly inset relative to the fixed portion of the side wall.

20

Mounted in or on the underside of the base 10 of the tray member 2 is hover means 3 which, when connected to a supply of a pressurized fluid, is capable of creating and sustaining a film of pressurized fluid beneath the underside of the tray member base. The hover means may be of any convenient form, selected from among the known alternatives as will be apparent to a skilled reader knowledgeable in the arts of air cushion vehicles and fluid bearings.

25 In a particular embodiment, the hover means comprises a plurality of air bearing elements or air skate elements together with their associated pipework and connectors enabling them to be connected to an external source of supply, for example compressed air.

30

35

Within the interior of the tray member 2, there

is disposed a flexible, porous lining 4 which is constructed of a material suitable to support its interior filling of soil 7 and natural growing grass 8. As shown, the lining 4 extends upwardly adjacent to the side walls 11 of the tray member 2. Contained within the lining 4 is the soil 7 placed within the tray member 2 up to a level proximate the lower edge of the detachable upper side wall portions 5. Above this level, the natural growing grass 8 extends to a height adjacent or just above the upper edge of the detachable side wall portions 5. Due to the fact that the upper, detachable side wall portions 5 are inset relative to the fixed portions of the side walls 11, the interior lining member 4 has upper portions 6, adjacent the side wall upper portions 5, which are also set inwardly of the fixed side wall portions. By this inset arrangement of the detachable upper side wall portions 5 and their associated inset portions 6 of the lining member 4, the natural growing grass at the periphery of the utility surface element is slightly inwardly compressed.

Alternatively, the detachable, upper side wall portions 5 may lie outwardly of the lower, fixed portions of the side walls 11, so that the grass 8 at the periphery of the utility surface lies over the top edge of the fixed sidewall portions 11.

The method of use of the described utility surface element, in forming a football pitch, will now be outlined.

In order to form a standard size football pitch, a large number of utility surface elements, such as the element 1 already described, will be needed. In a typical example, nine such elements will be needed

to be assembled side-by-side in a 3 x 3 matrix. These elements may be stored within any available, or suitably constructed, storage areas within or outside a normal stand provided on a football ground. By 5 being stored undercover, the elements are protected from the weather and may more readily be maintained in a suitable condition for use. Any particular elements which show extreme wear in use may be withheld from certain subsequent uses and replaced by standby 10 elements of an identical, or similar, construction. Conditions within the storage area may be optimised to the normal requirements of the natural growing grass. Thus, the amount of daylight or daylight-simulating 15 artificial light, water, nutrients, temperature and other relevant factors may be closely monitored and controlled in order to provide a healthy, dense, and consistent layer of growing grass 8 within the elements.

20 When it is required to move the elements 1 from within or outside the storage areas to the site where they will together form the useable football pitch, the hover means of each element is connected, for example by means of flexible hoses, to a suitable 25 source of compressed air. The ensuing generation of an air cushion or air film beneath each utility surface element raises the element above the underlying support surface and enables the element to be pushed or pulled with minimal effort laterally over 30 the underlying support surface. By this means, the requisite number of utility surface elements is transported from the storage areas to the area of the football ground where the pitch is to be constructed. At this area, the utility surface elements are placed 35 side by side in close engagement with the upstanding side walls 11 of adjacent elements 1 in contact. The

inner lining at each sidewall 11 and above a drainage layer 9 below the soil filling 7. Natural growing grass 8 forms a useful playing surface of the utility 25 surface element 1.

As in Figure 1, the embodiment of Figure 2 incorporates detachable upper sidewall portions 5 but these are provided in this embodiment on L-shaped arms 30 12 pivotable about pivots 12a beneath the base 10. At each side of the utility surface element 1, a plurality of the arms 12 support the upper continuous sidewall portion 5. As shown, the long limbs of the arms 12 lie outside the tray sidewalls 11 when the 35 arms 12 are in the positions shown in Figure 2a and Figure 2b, with the upper side wall portion 5 provided

on the arms 12, being set outwardly of the tray sidewall 11, such that the soil filling 7 and upper region of the lining 4 extend over the top edge of the sidewall 11. This position of the arms 12 is adopted 5 when the utility surface element 1 is in storage or is being transported to or from a storage area. Upper end regions of the arms 12 along one side also afford respective continuous rubbing strips 12b which, as can be seen in Figure 2b, may abut and, thus, give side 10 protection, when the utility surface elements 1 are in storage.

The arms 12 along each side also provide a respective continuous flange 5' at their upper ends. 15 In the position shown in Figure 2a the flange 5' defines approximately the level to which the soil filling 7 extends. This flange 5' is preferably provided by one limb of an angle edge member whose other limb provides the upper sidewall portion 5. 20 When the utility surface element 1 is in storage, as in Figure 2b, the adjacent flanges 5' provide some continuity between adjacent elements 1 to facilitate mowing of the grass, and to enable the grass cutting equipment to run over the joints.

25 As mentioned above, the arms 12 are maintained in the position shown in Figure 2a when the utility surface element 1 is in storage (Figure 2b) and during transportation. Just prior to installation of the 30 utility surface element 1 alongside another such element, in the formation of a utility surface or football pitch, the arms 12 are pivoted down, as seen in Figure 2c, to expose the sidewalls of the utility surface elements 1 to enable them to be closely abutted, as seen in Figure 2d, to provide a continuous 35 grass playing surface.

A utility surface element intended to have a side thereof at an edge of the utility surface, for example an outer edge of the football pitch, may have a modified form of side protection as seen in Figures 2e and 2f. Here, the pivotable arms 12 are modified to afford an extended horizontal edge 12c, when the arms are in the positions shown in Figure 2e, to facilitate mowing of the grass at such edge. Also, the arms 12 have an extended edge safety barrier 12d. Figure 2e shows such a utility surface element, with its arm 12 in the raised position, as it will be during storage or transportation. Figure 2f shows the same utility surface element, with its arm 12 in the dropped position, butted up to a side panel 13 at the edge of the football pitch.

It will be appreciated that the form of utility surface element 1 shown in Figure 2a provides a construction of sidewall protection which is heavy and requires much effort to pivot between its operative and inoperative positions. The arms 12, upper sidewall portions 5 and flanges 5' are generally of steel.

An alternative form of utility surface element 1 is shown in Figure 3. Here it will be seen that each sidewall 11 (only one shown) of the tray member is recessed inwardly commencing at a point just below the upper edge. Within the recess, which extends along the full length of the respective sidewall 11, are spaced structural webs 22 each arranged at right angles to the sidewall 11. These webs 22 give support to the edge profile of the sidewall 11 and are themselves supported from peripheral beams of a primary structural support grid 20 for the tray member base panels. As shown at the left hand side of Figure

3, the peripheral beams mount outwardly projecting bars which support base edge rubbing strips 21. These rubbing strips 21 act as buffers to accept the load of adjacent utility surface elements bumping against each 5 other during manoeuvring. These strips 21 may also incorporate locating lugs to assist in the correct location of utility surface elements 1 adjacent each other.

10       L-shaped pivoted arms 12 are provided and mount upper sidewall portions and flanges as in the embodiment of Figure 2a. However, in the embodiment of Figure 3 each arm 12 is pivoted to a respective structural web 22 within the sidewall recess. Each 15 arm 12 includes a locking arm 12' pivoted thereon and having a latching nose 12'' co-operable with a down-turned lip of an upper portion of the sidewall 11. The locking arms 12' are spring-urged to their latch-engaged positions. In these positions the latching 20 noses 12'' engage with the down-turned lip of the sidewall 11 and thereby retain the pivoted arms 12 in their raised positions, as shown, in which the sidewall protection is effective.

25       The overall weight and size of the sidewall protection is reduced in this embodiment compared with the embodiment of Figure 2a. This is because, in the present embodiment, the provision of the sidewall recesses enabling the disposition of the arm 12 pivots therewithin provides for the use of shorter, less massive arms 12. The effort involved in swinging the arms 12 and their supported structures is, thus, radically reduced. Moreover, the sidewall recesses give a measure of protection to the arms 12 and their 30 pivots when the utility surface elements 1 are in juxtaposed, installed positions as shown in Figure 4. 35

With reference now to Figures 4 and 5, each of the utility surface elements 1 is generally constructed as described with reference to the embodiment of Figure 3. Extending beneath the primary support structural support grid 20 is a latticework support structure 23 having a bottom beam 23' from which a plurality of legs 24 project downwards to rest on a suitable support surface 25. The arrangement of bottom beam 23' and legs 24 is such as to leave space beneath the bottom beam 23' and within the confines of the legs 24 for the insertion of a separate hover device 3 shown by the shading in Figure 5.

Figure 5 shows a first utility surface element 1, at the lefthand side, which has been transported by means of the hover device 3 to its installation position where it rests under its own weight with its legs 24 firmly engaged with the support surface 25. A second utility surface element 1, shown at the righthand side, is in the process of being transported by means of the hover device 3 to its installation position in which it will be juxtaposed to the first utility surface element 1.

The hover device 3 being used in this instance is a substantially rectangular block having a thickness just smaller than the height of the space beneath the bottom beam 23' of the utility surface elements 1. The block has a flat upper surface and its lower surface is provided with a plurality of suitable means, for example air skates, for creating a film or cushion of air between such lower surface and an underlying surface, such as the support surface 25.

The utility surface element 1 at the righthand side in Figure 5 is, thus, raised and held above the

support surface 25 by the operative hover device 3 whilst being moved laterally across the support surface 25 towards the stationary utility surface element 1 at the lefthand side. As a consequence, the 5 utility surface element 1 while being transported is slightly higher than the stationary utility surface element 1, by an amount "h" illustrated in Figure 5. Due to this relative vertical displacement, rubbing or similar interference at the adjacent side edges is 10 likely to occur as the moving, raised utility surface element 1 is gradually brought to its installation position by being lowered vertically relative to the stationary utility surface element as the hover device 3 is de-energised. Such rubbing or other interference 15 may cause edge damage to either or both utility surface elements 1, particularly the upper edge region(s) of the soil and grass.

In order to avoid such risk of damage, each 20 utility surface element 1 is modified, as will be described below, to have legs 24 which are adjustable in length sufficient to take up at least the vertical mismatch "h". In the currently most preferred form, each leg 24 embodies any suitable, known screw 25 adjustment mechanism which may be operated by rotation of a large-diameter wheel. These wheels are preferably intended to be rotated manually and thus have a diameter selected to provide for a suitably low rotation force.

30

The range of adjustment required will be quite small, typically a few centimetres. Alternative types of adjustable leg and adjustment mechanism may, of course, be used. Utility surface elements 1 having 35 adjustable legs 24, as described, will be brought to, and placed in, their installed juxtaposed positions as

outlined below:-

5 A first such utility surface element 1 will be transported by means of the hover device 3 to its installed position where it will be deposited to rest under its own weight with its legs 24 firmly engaged with the support surface 25. Prior to its transportation, this first utility surface element 1 will have had its legs 24 adjusted to their fully 10 retracted (short) positions, and it will be transported with the legs 24 remaining thus.

15 At its installation site, and either before or after de-energisation of the hover device 3, the legs 24 will be adjusted to their partially or fully extended (long) positions. If this is done before de-energisation of the hover device 3, (which is the preferred option) then assuming the hover device 3 20 hovers (with its supported utility surface element 1) at a height "h" above the support surface 25, it will be necessary to extend the legs 24 by an amount "h" so that they touch the support surface 25 and at least partially relieve the load from the hover device 3 which may then be removed laterally (after any 25 necessary degree of de-energisation to free it for such motion). This procedure involves substantially no vertical "settling" movement of the utility surface element 1.

30 After such installation of the first utility surface element 1, a second, similar utility surface element 1 is similarly transported, with its legs 24 in their retracted positions, by means of the hover device 3. Although this second utility surface 35 element 1 will ride at a height "h" above the support surface 25 whilst supported on the hover device 3, it

will be apparent that the upper regions of both this, and the already-installed utility surface element 1, will lie in substantial vertical alignment, the former having been notionally or actually elevated by the 5 amount "h" by extension of its legs 24. When the second utility surface element 1 is correctly positioned, and whilst it is still supported by the hover device 3 at the height "h" above the support surface 25, its legs 24 are extended by an amount "h" 10 so that they touch the support surface 25 and at least partially relieve the load from the hover device 3.

Because this procedure involves substantially no vertical "settling" movement of the second utility 15 surface element 1, relative rubbing or other interference at adjacent side edges of the two utility surface elements 1 as they are brought to installation juxtaposition is obviated.

20 Subsequently, further utility surface elements 1 with adjustable legs may be brought up and installed following generally the same procedure.

25 As previously mentioned, the utility surface elements 1 may be dimensioned such that nine of them will need to be assembled in a 3 x 3 matrix to form a standard size football pitch. In such an assembly it will be apparent that at certain locations corner regions of four adjacent utility surface elements 1 30 will be juxtaposed. At such a location the grass playing surface is particularly weak and more than usually prone to wear and damage.

35 In order to eliminate this problem, each utility surface element 1 may be modified to have a less square, more elongate shape whilst having

substantially the same playing surface area. Thus, as seen in Figure 6, each utility surface element 1a, 1b, 1c, 1d, (and so on) of the football pitch 1 has a length equal to the full width of the pitch. The 5 pitch 1 still comprises nine utility surface elements, but the weak corner locations of the 3 x 3 matrix arrangement are avoided.

As can be seen in Figure 6, the utility surface 10 element 1a is being transported away from the site of the pitch 1 and is well on its way towards a storage area, whilst other utility surface elements 1b, 1c are in different (earlier) stages of separation from the still-installed utility surface elements 1d. The 15 arrow A in Figure 6 indicates an initial direction of movement of the utility surface element 1c during de-installation.

Other elements of a typical football ground are 20 shown only diagrammatically around the perimeter of the pitch 1 in Figure 6. After removal of all the utility surface elements, to leave the underlying support surface exposed, such surface may be used for an alternative activity. To this end, if desired, 25 additional, other peripheral elements, such as additional seating stands, may be brought in.

In connection with the present invention, and in order to perfect the grass pitch and obtain the best 30 possible surface, the Sports Turf Research Institute recommends that the grass used be based on fine-leaved cultivars of perennial rye-grass with a proportion of smooth-stalked meadow-grass; that the rootzone be of a free-draining medium as in a typical new outdoor 35 winter pitch construction; and that the rootzone be placed directly on a layer of porous drainage

aggregate of, say, 100mm thickness. Outlets from the utility surface element tray members should be connected into the general surface water drainage system.

5

Furthermore, the top 100mm of each tray side will be detachable, thus exposing the upper portion of the rootzone. Once the utility surface elements 1 are butted together, this will ensure that the players 10 using the facility will not come into direct contact with the tray members themselves. A geotextile fabric will be used to line the rootzone, to prevent grass roots penetrating into adjoining rootzones.

15

Moreover, the use of electric heating cables placed in the lower parts of the rootzone so that each utility surface element can be heated on an individual basis is desirable.

20

It is recommended that some form of air circulation system be incorporated within the stadium to control humidity and temperature. Ideally the utility surface elements will not be left indoors for more than 3 or 4 days.

25

Thus, it will be seen that the invention provides a utility surface, such as a football pitch, which is readily and simply assembled, disassembled, and reassembled as and when required and which is easy and 30 convenient to maintain by virtue of the capability to repair or replace individual elements thereof. During the normal course of pitch management the judicious replacement of damaged or excessively worn elements by good, spare elements, and the cyclical repositioning 35 of elements so as to occupy different positions on the finished pitch over a period of time, will ensure that

a useful pitch surface of sound quality and consistent wear and durability across substantially the entirety of its exposed surface is normally available for play.

5 Any or all of the elements making up the pitch may readily be removed to a storage area whenever required, for example after each match. This will not only obviate the need for temporary protective measures, such as tarpaulin coverings, but will also  
10 allow the alternative use of the underlying surface which is exposed once the utility surface elements have been removed from it and transferred to their storage areas. Thus, the underlying surface may be used for an alternative purpose having little or no  
15 similarity to the purpose to which a football pitch is directed. Further, as already mentioned, the stored utility surface elements may be subjected to repair or maintenance on a regular basis whilst under suitable and convenient cover, and appropriate growing  
20 conditions for the natural living grass adequately maintained. It will be apparent that should any particular element require it, the grass and soil may be removed entirely and the element be refilled and replanted.

25 Although, in the foregoing description the hover means is said to be connectable to an external source of pressurized fluid, in a modification each utility surface element may be provided with its own, inboard source. Further, although the utility surface and individual elements thereof has been described in relation to a football pitch and/or an element comprising a filling of soil and natural growing grass, it is within the scope of this invention to  
30 35 embody it in other forms. For example, still within the confines of a football pitch or similar sports

playing surface, the filling of soil may be omitted or replaced by some suitable equivalent and the natural growing grass may be replaced by one of the known forms of artificial grass. Alternatively, the filling 5 material may be of concrete, tarred stones and/or ballast, or other similar materials selected according to the nature of the useful surface required for the intended purpose. In this regard it will be apparent that the utility surface of the invention, especially 10 as embodied as a plurality of sub-elements, may be constructed, arranged, or adapted for use in any one of a number of different leisure or recreational purposes, such as sports pitches, for example, cricket tables, wickets, creases and/or parts thereof, or 15 playgrounds. Commercial purposes, such as support areas for storage or display of items, for example to provide temporary car parking space or other utilitarian purposes such as to provide temporary roadways, temporary walkways, or other standing 20 surfaces are envisaged. Thus, the invention is to be limited only by the scope of the appended claims.

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10 the presence and effect of the fluid cushion being to  
rais the body above an underlying support surface,  
thereby enabling the utility surface to b moved  
laterally across said underlying surface.

15 2. A utility surface as claimed in claim 1, wherein  
said hover means comprises at least one fluid bearing  
element.

20 3. A utility surface as claimed in claim 1 or claim  
2, wherein said hover means comprises at least one air  
bearing or air skate.

4. A utility surface as claimed in any preceding  
claim, wherein a source affording a supply of  
pressurized fluid is mounted on the body.

25 5. A utility surface as claimed in claim 4, wherein  
the source is a source of compressed air.

30 6. A utility surface as claimed in any of claims 1  
to 3, wherein said hover means is associated with  
pipework and valving enabling it to be connected to an  
external source of pressurized fluid.

35 7. A utility surface as claimed in any preceding  
claim, wherein the body comprises a tray-shaped  
element having upstanding side walls and arranged to

receive a filling material or materials to an appropriate depth, such material or materials, when present, forming the useful surface of the body.

5 8. A utility surface as claimed in claim 7, wherein the tray-shaped element is internally lined by a flexible membrane

10 9. A utility surface as claimed in claim 8, wherein the flexible membrane is porous.

10. A utility surface as claimed in any preceding claim, wherein the body further comprises a filling of soil in which there is growing live plants.

15 11. A utility surface according to claim 10, wherein the live plants comprise grass plants.

20 12. A utility surface according to claim 10 or 11, wherein the height of the live plants is greater than that of the flexible membrane.

25 13. A utility surface as claimed in any preceding claim, comprising a plurality of identical or similar elements each of which has a body providing a portion of the upper surface intended for use and operable hover means associated or associable with the body at or adjacent an underside thereof.

30 14. A utility surface according to claim 13, wherein each element comprises a tray-shaped element having a filling of soil in which there is growing a plurality of living plants, the elements being juxtaposed in an arrangement which constitutes a playing area for playing a game.

15. A utility surface as claimed in claim 13 or 14 constructed, arranged, and adapted for use as a football pitch.
- 5    16. An element for use in constructing a utility surface, the element comprising a generally tray-shaped member having at least one upstanding side wall, an upper portion of the or at least one said side wall being detachable or otherwise movable, and  
10    a flexible lining disposed within the interior of the tray-shaped member, and having a portion thereof lying adjacent the or each said side wall.
- 15    17. An element as claimed in claim 16, wherein the membrane within the tray-shaped member has side walls which extend upwardly adjacent the respective side walls of the member, an upper portion of each side wall of the membrane lying adjacent the upper side wall portion of the member.
- 20    18. A utility surface according to any one of claims 7 to 15, or an element for use in constructing a utility surface according to claim 16 or 17, in which an upper portion of each side wall is detachable.
- 25    19. A utility surface or element as claimed in claim 18, wherein the detachable side wall portion is laterally inset inwardly from its associated fixed side wall portion.
- 30    20. A utility surface according to any one of claims 7 to 15 or an element for use in constructing a utility surface according to claim 16 or 17, wherein an upper portion of the or each side wall is pivotable between a raised operative position and a lowered inoperative position.
- 35

21. A utility surface or element as claimed in claim  
20, wherein the upper portion of a side wall is  
mounted on a plurality of pivotable arms each of L-  
shape.
- 5
22. A utility surface or element as claimed in claim  
21, wherein each L-shaped arm has a pivot at the outer  
free end of one of its arms and is connected to a  
flanged member at the outer free end of the other of  
10 its arms.
- 15
23. A utility surface or element as claimed in claim  
22, wherein the flanged member has a first face  
affording the upper portion of the side wall and a  
second face at right angles to the first and defining  
an upper edge of the side wall.
- 20
24. A utility surface or element as claimed in claim  
23, wherein an extension from the outer edge of the  
second face lies normal thereto and provides an edge  
safety barrier member.
- 25
25. A utility surface or element as claimed in claim  
22, 23 or 24, wherein the pivot is disposed beneath a  
base of the tray-shaped member and connects the arm  
thereto.
- 30
26. A utility surface or element as claimed in claim  
22 or 23, wherein a lower portion of the side wall is  
inset relative to the upper portion thereof and the  
pivot is disposed beneath the overhang of the upper  
portion relative to the lower portion.
- 35
27. A utility surface or element as claimed in claim  
26, wherein the overhang affords a space in which lie  
a plurality of webs equal in number to the number of

associated side of the tray, and a respective arm attached thereto by its pivot.

- 5 28. A utility surface or element as claimed in any of claims 21 to 27, wherein each arm includes latch means co-operable with a fixed portion of the side wall to retain the arm in its raised operative position.
- 10 29. A utility surface or element as claimed in any of claims 21 to 28, wherein the arms mount a continuous rubbing strip affording lateral protection for the side wall.
- 15 30. A utility surface or element as claimed in any of claims 16 to 29, wherein the tray-shaped member contains soil up to a level proximate a lower edge of each detachable upper side wall portion, and living plants growing within the soil and extending to a height beyond an upper edge of each detachable side wall portion.
- 20 31. A utility surface or element as claimed in claim 23 or any claim appended thereto, wherein the tray-shaped member contains soil up to a level proximate the upper edge of the sidewall, and living plants growing within the soil and extending to a height beyond said upper edge.
- 25 32. A utility surface or element as claimed in claim 30 or 31, wherein the plants are grass plants.
- 30 33. A utility surface or element as claimed in any of claims 16 to 33, wherein the grass plants at the periphery are maintained laterally inwardly compressed by virtue of the insertion of the detachable upper side wall.

wall portions.

34. A utility surface or element as claimed in any of claims 16 to 33, including adjustable-length legs and 5 means for adjusting the legs.

35. A utility surface comprising a plurality of elements as claimed in claim 18 or any claim appended thereto, wherein the elements are disposed in lateral 10 juxtaposition with the detachable upper side wall portions between adjacent elements having been detached. ~~before lateral position~~

36. A utility surface comprising a plurality of 15 elements as claimed in claim 20 or any claim appended thereto, wherein the elements are disposed in lateral juxtaposition with the pivotable upper side wall portions between adjacent elements having been placed in their lowered inoperative positions.

20 37. A method of preparing a utility surface for use, wherein a source of compressed air is energised in order to provide a continuous supply of compressed air to hover means associated or associable with a body of 25 the surface, such as to create and sustain at the underside of the body a cushion of compressed air, which raises the utility surface above an underlying support surface, and traversing the utility surface laterally relative to the underlying support surface 30 from a storage position to a position of use, and de-energizing said source of pressurized air whereby the utility surface comes to rest under its own weight upon the underlying support surface.

35 38. A method according to claim 37, wherein the utility surface comprises a plurality of identical or

similar elements, each of which is moved as aforesaid, into juxtaposition to provide a utility surface of a required shape and size.

- 5        39. A method according to claim 38, wherein each element of the utility surface is constructed according to claim 33 and wherein, after the elements have been arranged in juxtaposition, detachable upper side wall portions of adjacent elements are removed,  
10        and upper portions of a respective membrane of adjacent elements are pressed into interengagement, so that a useful surface comprising living plants presents an appearance and experience of continuity across the entire utility surface.
- 15        40. A method according to claim 38, wherein each element of the utility surface is constructed according to claim 31 and wherein, before the elements have been arranged in juxtaposition, pivotable upper  
20        side wall portions of intended adjacent elements are placed in their lowered inoperative positions.
- 25        41. A method according to claim 40, wherein a first element deployed upon the underlying support surface has had adjustable length legs thereof adjusted to raise the useful surface to a predetermined height above the underlying support surface, a second element is brought up to the first element such that the useful surfaces of both elements lie at substantially the same predetermined height above the underlying support surface, and adjustable length legs of the second element are adjusted to support said second element on the underlying support surface such that the equality of said predetermined height is  
30        maintained after the second element has been deployed.
- 35

42. A method as claimed in any of claims 37 to 41, applied to the construction and arrangement of a pitch for playing a game.
- 5      43. A method of preparing a games pitch for use, comprising providing a plurality of pitch elements at a storage position, moving a selected number of the plurality of pitch elements from the storage position to a position of use in which the elements are arranged in juxtaposition to afford a surface area corresponding to at least the required dimensions of the pitch, and securing such pitch elements in such juxtaposition, movement of such pitch elements from the storage position being performed by traversing each such element over an underlying support surface whilst being supported from said support surface by a cushion of a pressurized fluid.
- 20      44. A method of preparing a games pitch for use, comprising providing a plurality of pitch elements at a storage position, each pitch element having a length substantially equal to the intended size of the games pitch in a first dimension and a width substantially equal to an exact sub-multiple of the intended size of the games pitch in a second dimension at right angles to the first dimension, moving a selected member of the plurality of pitch elements from the storage position to a position of use in which the elements are arranged in juxtaposition in a two-dimensional linear array which has one dimension substantially equal to the elemental length and another dimension substantially equal to a multiple of the elemental width, and securing such pitch elements in such juxtaposition, movement of the pitch elements from the storage position being performed by transversing each such element over an underlying support surface whilst

46. A utility surface constructed, arranged, and adapted for use as herein described with reference to Figure 1 of the accompanying drawings.

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47. A utility surface constructed, arranged, and adapted for use as herein described with reference to Figures 2a, 2b, 2c and 2d of the accompanying drawings.

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48. A utility surface constructed, arranged, and adapted for use as herein described with reference to Figures 2e and 2f of the accompanying drawings.

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49. A utility surface constructed, arranged, and adapted for use as herein described with reference to Figure 3 of the accompanying drawings with or without the modification of Figures 4 and 5 of the accompanying drawings.

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50. A utility surface constructed, arranged, and adapted for use as herein described with reference to Figure 6 of the accompanying drawings.

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51. A utility surface according to any one of claims 46 to 50, which is a football pitch.

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52. An element for use in constructing a utility surface, substantially as herein described with reference to Figure 1, or Figures 2a, 2b, 2c and 2d, or Figures 2e and 2f, or Figure 3, or Figure 4, or

Figure 5 of the accompanying drawings.

53. An element for use in constructing a football pitch, substantially as herein described with reference to Figure 1, or Figures 2a, 2b, 2c, and 2d, or Figures 2e and 2f, or Figure 3, or Figure 4, or Figure 5 of the accompanying drawings.

54. A method of constructing, arranging, or preparing for use a utility surface or football pitch, substantially as herein described with reference to Figure 1, or Figures 2a, 2b, 2c, and 2d, or Figures 2e and 2f, or Figure 3, or Figure 4, or Figure 5, of the accompanying drawings.

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**Patents Act 1977**  
**Examiner's report to the Comptroller under Section 17**  
**(The Search report)**

**Application number**  
**GB 9511428.6**

<b>Relevant Technical Fields</b>		<b>Search Examiner</b> <b>R HOWE</b>
(i) UK Cl (Ed.N)	A6D; A1E B7K; B8H; E1G	
(ii) Int Cl (Ed.6)	E01C; A63C	
<b>Databases (see below)</b>		<b>Date of completion of Search</b> <b>8 AUGUST 1995</b>
(i) UK Patent Office collections of GB, EP, WO and US patent specifications.		<b>Documents considered relevant following a search in respect of Claims :-</b> <b>1-15, 20-54</b>
(ii) ONLINE: WPI		

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A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
X	GB 2253600 A	(GOOM)	1-3, 6
X	GB 2138690 A	(MADDEN) -	1-3, 6, 7, 10, 11, 13-15, 37, 38, 43, 45
X	US 3948344	(JOHNSON)	1-3
X	WO 92/05690 A1	(GREENWAY)	1, 2, 3, 7, 10, 11, 13, 14, 15, 37, 38, 43, 45

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The  
Patent  
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Application No: GB 9511428.6  
Claims searched: 16-19

Examiner: David Whitfield  
Date of search: 20 September 1995

Patents Act 1977  
Further Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.N): A6D D37X1 D39X B8P PK9

Int Cl (Ed.6): E01C 13/00 A63C 19/00

Other:

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X	GB2138690A (MADDEN) (WHOLE DOCUMENT)	16,17

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